CLAIMS

What is claimed is:

1. A fabrication method comprising the steps of

providing a first component and a second component;

positioning the first component in facing-but-spaced apart relation to the second component;

placing a bonding medium between the first component and the second component, the bonding medium comprising

at least two malleable spheres made of a metal that bonds to both the first component and to the second component when subjected to a sufficiently large force, and

a quantity of an uncured adhesive; thereafter

bonding the first component to the second component using the bonding medium, the step of bonding including the steps of

supplying a bonding apparatus having at least one force actuator;

the bonding apparatus pressing the first component against the second component in a facing-but-spaced-apart relation, with the bonding medium therebetween, with a sufficient bonding force to bond the malleable spheres both to the first component and to the second component, simultaneously

monitoring at least one measured bonding reaction of the first component and the second component, and simultaneously

controlling the bonding apparatus responsive to the step of monitoring, and thereafter

curing the adhesive.

2. The method of claim 1, wherein the step of controlling includes the steps of

providing a set of bonding reaction limitations,

comparing the at least one measured bonding reaction with the respective set of bonding reaction limitations, and

sending control signals to the at least one force actuator responsive to the step of comparing.

3. The method of claim 2, wherein the step of providing a set of bonding reaction limitations includes the steps of

evaluating a set of stresses that cause damage to the first component, and

selecting the set of bonding reaction limitations responsive to the step of evaluating the set of stresses.

4. The method of claim 1, wherein the steps of placing and the bonding apparatus pressing include the steps of

positioning the first component and the second component in a facing relationship in the bonding apparatus,

dispensing the adhesive between the first component and the second component,

positioning the spheres in the adhesive,

bringing the first component and the spheres, and the second component and the spheres, into touching contact with each other, and

forcing the first component toward the second component with sufficient force to bond the spheres to the first component and to the second component.

5. The method of claim 1, wherein the step of controlling includes the step of

determining a set of maximum stresses applied to the first component.

6. The method of claim 1, wherein the step of providing a first component and a second component includes the steps of

providing a sensor chip assembly first component.

7. The method of claim 1, wherein the step of providing a first component and a second component includes the steps of

providing a sensor chip assembly first component, and

providing a mounting platform second component.

8. The method of claim 1, wherein the step of the bonding apparatus pressing includes the step of

the bonding apparatus loading according to a preselected load profile.

9. The method of claim 1, wherein the step of placing a bonding medium includes the steps of

furnishing spheres comprising a metal selected from the group consisting of indium, tin, germanium, and gold.

10. The method of claim 1, wherein the step of curing the adhesive includes the step of

removing the bonding force prior to completion of full curing of the adhesive.

11. A fabrication method comprising the steps of

providing a first component and a second component;

providing a bonding medium comprising

at least two malleable spheres made of a metal that bonds to both the first component and to the second component when subjected to a sufficiently large force, and

a quantity of an uncured adhesive;

bonding the first component to the second component using the bonding medium, the step of bonding including the steps of

supplying a bonding apparatus having at least one force actuator,

positioning the first component and the second component in a facing relationship to each other in the bonding apparatus,

dispensing the adhesive between the first component and the second component,

positioning the spheres in the adhesive, thereafter

bringing the first component, the second component, and the

spheres into touching contact with each other,

the bonding apparatus forcing the first component toward the second component with sufficient force to bond the spheres to the first component and to the second component to form an assembly,

monitoring at least one measured bonding reaction of the first component and the second component,

controlling the bonding apparatus responsive to the step of monitoring, the steps of forcing, monitoring, and controlling being performed simultaneously, and thereafter

curing the adhesive.

12. The method of claim 11, wherein the step of controlling includes the step of

providing a set of bonding reaction limitations,

comparing the measured bonding reactions with the respective set of bonding reaction limitations, and

sending control signals to the at least one force actuator responsive to the step of comparing.

13. The method of claim 12, wherein the step of providing a set of bonding reaction limitations includes a step of

evaluating a set of stresses that cause damage to the first component, and

selecting the set of bonding reaction limitations responsive to the step of evaluating the set of stresses.

14. The method of claim 11, wherein the step of controlling includes the step of

determining a set of maximum stresses applied to the first component.

15. The method of claim 11, wherein the step of providing a first component and a second component includes the steps of

providing a sensor chip assembly first component.

16. The method of claim 11, wherein the step of providing a first component and a second component includes the steps of

providing a sensor chip assembly first component, and

providing a mounting platform second component.

17. The method of claim 11, wherein the step of the bonding apparatus pressing includes the step of

the bonding apparatus loading according to a preselected load profile.

18. The method of claim 11, wherein the step of placing a bonding medium includes the steps of

furnishing spheres comprising a metal selected from the group consisting of indium, tin, germanium, and gold.

19. The method of claim 11, wherein the step of curing the adhesive includes the step of

removing the bonding force prior to completion of full curing of the adhesive, and

removing the assembly from the bonding apparatus.

20. A fabrication method comprising the steps of

providing a sensor chip assembly and a mounting platform;

positioning the sensor chip assembly in facing-but-spaced apart relation to the mounting platform;

placing a bonding medium between the sensor chip assembly and the mounting platform, the bonding medium comprising

at least two malleable spheres made of a metal selected from the group consisting of indium, tin, germanium, and gold, and

a quantity of an uncured adhesive;

bonding the sensor chip assembly to the mounting platform using the bonding medium, the step of bonding including the steps of

supplying a bonding apparatus having a force actuator;

the bonding apparatus pressing the sensor chip assembly against the mounting platform, with the bonding medium therebetween, with a sufficient bonding force to bond the malleable spheres both to the sensor chip assembly and to the mounting platform to form an assembly, simultaneously

monitoring at least one measured bonding reaction of the sensor chip assembly and the mounting platform, and simultaneously

controlling the bonding apparatus responsive to the step of monitoring, and thereafter

curing the adhesive, the step of curing the adhesive including the steps of

removing the bonding force prior to completion of full curing of the adhesive, and

removing the assembly from the bonding apparatus.